CH550 AND CH551 CHILLERS

Operator's & Installation Manual

Release Date: August 9, 2002
Publication Number: 91272
Revision Date: May 22, 2014
Revision: F

Visit the Cornelius web site at www.cornelius.com for all your Literature needs.

The products, technical information, and instructions contained in this manual are subject to change without notice. These instructions are not intended to cover all details or variations of the equipment, nor to provide for every possible contingency in the installation, operation or maintenance of this equipment. This manual assumes that the person(s) working on the equipment have been trained and are skilled in working with electrical, plumbing, pneumatic, and mechanical equipment. It is assumed that appropriate safety precautions are taken and that all local safety and construction requirements are being met, in addition to the information contained in this manual.

This Product is warranted only as provided in Cornelius' Commercial Warrant applicable to this Product and is subject to all of the restrictions and limitations contained in the Commercial Warranty.

Cornelius will not be responsible for any repair, replacement or other service required by or loss or damage resulting from any of the following occurrences, including but not limited to, (1) other than normal and proper use and normal service conditions with respect to the Product, (2) improper voltage, (3) inadequate wiring, (4) abuse, (5) accident, (6) alteration, (7) misuse, (8) neglect, (9) unauthorized repair or the failure to utilize suitably qualified and trained persons to perform service and/or repair of the Product, (10) improper cleaning, (11) failure to follow installation, operating, cleaning or maintenance instructions, (12) use of "non-authorized" parts (i.e., parts that are not 100% compatible with the Product) which use voids the entire warranty, (13) Product parts in contact with water or the product dispensed which are adversely impacted by changes in liquid scale or chemical composition.

Contact Information:

To inquire about current revisions of this and other documentation or for assistance with any Cornelius product contact:

www.cornelius.com

800-238-3600

Trademarks and Copyrights:

This document contains proprietary information and it may not be reproduced in any way without permission from Cornelius.

This document contains the original instructions for the unit described.

CORNELIUS INC
101 Regency Drive
Glendale Heights, IL
Tel: + 1 800-238-3600

Printed in U.S.A.

TABLE OF CONTENTS

Safety Instructions. 1
Read and Follow ALL Safety Instructions 1
Safety Overview 1
Recognition 1
Different Types of Alerts 1
Safety Tips 1
Qualified Service Personnel. 1
Safety Precautions 2
Shipping And Storage 2
Introduction 3
Specifications 3
Installation Instructions 4
Location 4
Plumbing 4
Electrical 4
Start-Up/Operation. 5
Thermostat 5
(Temperature Controller) 5
Standard Thermostat Eliwell IC902 5
Maintenance 6
Service 7
Removing Wrapper 7
Replacing Switch 7
Replacing Thermostat 7
Replacing Fan Blade and/or Motor 7
Replacing Pump 7
Fluid Recommendation 8
Troubleshooting. 9
Parts List. 11

SAFETY INSTRUCTIONS

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

Safety Overview

- Read and follow **ALL SAFETY INSTRUCTIONS** in this manual and any warning/caution labels on the unit (decals, labels or laminated cards).
- Read and understand ALL applicable OSHA (Occupational Safety and Health Administration) safety regulations before operating this unit.

Recognition

Recognize Safety Alerts

This is the safety alert symbol. When you see it in this manual or on the unit, be alert to the potential of personal injury or damage to the unit.

DIFFERENT TYPES OF ALERTS

DANGER:
Indicates an immediate hazardous situation which if not avoided **WILL** result in serious injury, death or equipment damage.

WARNING:
Indicates a potentially hazardous situation which, if not avoided, COULD result in serious injury, death, or equipment damage.

CAUTION:
Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury or equipment damage.

SAFETY TIPS

- Carefully read and follow all safety messages in this manual and safety signs on the unit.
- Keep safety signs in good condition and replace missing or damaged items.
- Learn how to operate the unit and how to use the controls properly.
- **Do not** let anyone operate the unit without proper training. This appliance is **not** intended for use by very young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
- Keep your unit in proper working condition and do not allow unauthorized modifications to the unit.

QUALIFIED SERVICE PERSONNEL

WARNING:
Only trained and certified electrical, plumbing and refrigeration technicians should service this unit. **ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.**

© 2002-2014, Cornelius Inc.

Publication Number: 91272

Safety Precautions

This unit has been specifically designed to provide protection against personal injury. To ensure continued protection observe the following:

WARNING:
Disconnect power to the unit before servicing following all lock out/tag out procedures established by the user. Verify all of the power is off to the unit before any work is performed.

Failure to disconnect the power could result in serious injury, death or equipment damage.

CAUTION:
Always be sure to keep area around the unit clean and free of clutter. Failure to keep this area clean may result in injury or equipment damage.

Shipping And Storage

CAUTION:
Before shipping, storing, or relocating the unit, the unit must be sanitized and all sanitizing solution must be drained from the system. A freezing ambient environment will cause residual sanitizing solution or water remaining inside the unit to freeze resulting in damage to internal components.

 © 2002-2014, Cornelius Inc.

INTRODUCTION

The Cornelius "CH" Series Water Chillers (Models CH550-A and CH551-A) are specifically designed to cool clean water before it is circulated to the cooling application. The Unit includes a complete refrigeration system and associated controls housed in a sturdy sheet metal enclosure with perforated panels for air circulation. Options include a reservoir and a choice of pumps and temperature controls to provide a self-contained liquid cooling circulation system tailored to a particular closed loop or tank application.

On closed loop systems, the Unit is provided with a pump and reservoir for recirculation of water from the chiller to the process. On tank cooling systems, the Unit is provided without the reservoir and the pump is optional for recirculation of water from the chiller to the tank. Control temperature is sensed on the outlet of the chiller for closed loop systems and it is sensed on the inlet of the chiller for tank cooling systems.

The pump options consist of a small magnetic drive pump as standard with a variety of magnetic drive and positive displacement pumps available for particular flow and pressure requirements. An optional bypass valve is available for the pump circulation system. (This valve is standard on Units utilizing the positive displacement pumps). This can be used to adjust pump flow and pressure to match process requirements. This valve also allows internal recirculation within the chiller in the event the chiller outlet is obstructed.

SPECIFICATIONS

	CH550-A	CH551-A
Condensing Unit Horse Power	1/2	1/2
Electrical (Volts/Phase/Hz)	115/1/60	230/1/60
F. L. A. (Amps)	12.5	6.2
Reservoir Capacity (Gal.)	2	2
Refrigerant 134-A (Lbs)	1.375	1.375
Stainless Steel Connections	1/2 in. FPT	1/2 in. FPT
Operating Water Temperature Range	40°-100° F	40°-100° F
Net Weight (Lbs)	160	160
Dimensions : Depth (Inches)	16-3/4	16-3/4
Width (Inches)	15-1/8	15-1/8
Height (Inches)	28-1/2	28-1/2

© 2002-2014, Cornelius Inc.

Publication Number: 91272

INSTALLATION INSTRUCTIONS

LOCATION

Locate the chiller indoors in a well ventilated area with ambient temperatures in the range of 65° to 100° F. Allow a minimum of six inches of clearance around the chiller for proper air circulation. Avoid hot air discharge from other equipment or enclosed areas where heat could build up and cause a rise in ambient temperature.

PLUMBING

Follow standard plumbing practices and local codes in making water connections. Piping that is exposed to high ambient temperatures may need to be insulated to prevent condensation and/or significant liquid heat gain. Hook up the outlet of the chiller but delay making the final connection to the inlet of the chiller until the system is filled with water (see Start-up/OPERATION).

ELECTRICAL

All wiring must conform to the National Electric Code and any applicable local codes. The chiller must be:

1. Permanently wired by means of conduit from the junction box in the rear of the chiller cabinet to a properly fused disconnect of proper amperage or:
2. Wired to a properly rated power cord and plugged into an outlet with appropriate disconnect and amperage rating.

 © 2002-2014, Cornelius Inc.

START-UP/OPERATION

Before the unit can be operated, it is important that the circulating system be filled with water. On systems with a reservoir, ensure that the drain plug is in place and the plug is secure. Fill the reservoir through the fill port with water. The water level sight glass on the front panel will indicate "Full" when enough water has been added. Once full, make the final connection to the inlet and outlet of the chiller. On system without a reservoir, the pump should be primed before operation. Attach a water source to the inlet of the chiller and fill the Unit with clean water. The system is filled when the water can be seen flowing at the chiller outlet. Once full, make the final connection to the inlet of the chiller.

Turn the power switch to the "On" position. The switch illuminates indicating power to the Unit and the pump operates, the thermostat can be adjusted to the proper set point.

THERMOSTAT

(Temperature Controller)

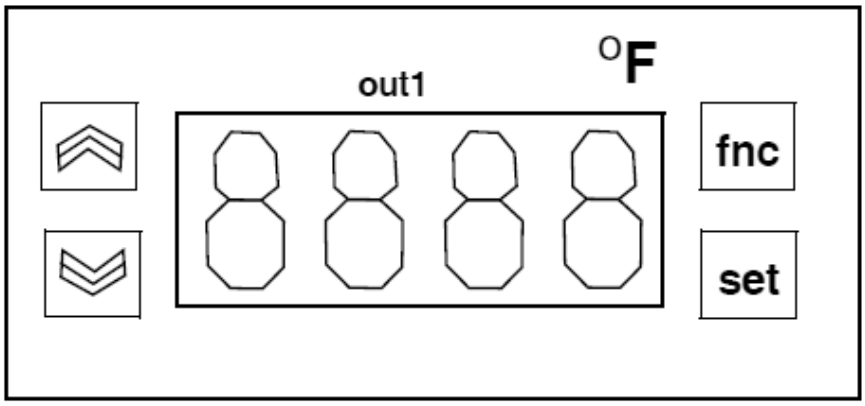

Figure 1. Control Panel

Standard Thermostat Eliwell IC902

The following procedure should be followed to adjust the Eliwell IC902 thermostat temperature setting:

1. To set the **SET POINT**, press and release the **SET** button. **SET** displays.
2. Press the **SET** button again, the current **SET POINT** is displayed. Press the **UP** or **DOWN** button to change the **SET POINT** to the desired temperature.
3. Pres the **fnc** button twice to exit the program. The current liquid temperature is displayed.

The thermostat has a range that is pre-set at the factory. The range is 40° F (5° C) to 100° F (38° C). If operation outside of this range is required, please contact the Cornelius Technical Service Department.

When the flow rate to the process is critical, a flow meter and valve should be installed in the line in order to obtain the proper flow rate. On Units with optional bypass valve, the aforementioned valve can be omitted and the flow can be adjusted with this valve. Turning the valve clockwise increases the flow to the process whereas turning the valve counterclockwise decrease the flow to the process.

Once these start-up procedures are complete, the chiller is ready for standard operation.

⚠ WARNING:
Never operate the chiller with enclosure panels removed. Always use the illuminated switch to turn off the chiller when it is not being used. Always ensure that all air inlets and outlets are free of obstructions. Be sure that the reservoir is filled with fluid prior to powering up the unit (see Fluid Recommendations page).

© 2002-2014, Cornelius Inc.

Publication Number: 91272

MAINTENANCE

WARNING:
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work.

Failure to comply could result in serious injury, death or damage to the equipment.

The chiller requires very little normal maintenance. The condenser fins should be cleaned by blowing compressed air through the condenser. from the fan side as required to prevent blockage of air flow by dirt and debris that may accumulate over time. The positive displacement pump motor should be lubricated with thirty drops of SAE 20 oil once each year. The circulation system should be drained and flushed periodically to avoid build up and possible restriction of flow contaminants. Following these simple procedures will ensure many trouble free hours of chiller operation.

 © 2002-2014, Cornelius Inc.

SERVICE

WARNING:
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work.

Failure to comply could result in serious injury, death or damage to the equipment.

Service of the chiller is limited to replacing the switch, the thermostat, the fan motor, and the pump. Charging and other refrigeration problems must be performed by a qualified refrigeration technician.

Removing Wrapper

1. Disconnect electrical power from the unit.
2. Remove the seven screws from each side of the wrapper and the two screws that secure the wrapper to the front and back panels. Retain all hardware and lift the wrapper off the unit.

Replacing Switch

1. Remove the wrapper, as described in Removing Wrapper.
2. Remove the spade lugs from the existing switch and note connection points.
3. Remove the switch from the front panel.
4. Install the new switch in the front panel and connect the leads to the new switch.
5. Install the wrapper.

Replacing Thermostat

1. Remove the wrapper, as described in Removing Wrapper.
2. Loosen the screw terminals securing the wires at the rear of the thermostat. Note connection points and remove the wires.
3. Remove the screw securing the mounting bracket to the back of the thermostat.
4. Remove the thermostat from the front panel.
5. Install the new thermostat in the front panel and secure it with the mounting bracket.
6. Reconnect the wires at back of the thermostat.
7. Install the wrapper.

Replacing Fan Blade and/or Motor

1. Remove the wrapper, as specified in Removing Wrapper.
2. Remove the screws securing the fan guard to the fan shroud.
3. Remove the conduit connection at the back of the motor and disconnect the wire leads.
4. Remove the bolts securing the fan mounting bracket to the base and remove the fan/motor assembly.
5. Separate the fan blade from the motor and install the new blade or motor.
6. Re-install the fan mounting bracket and fan guard. Re-connect the wire leads and conduit connection.
7. Install the wrapper.

Replacing Pump

1. Remove the wrapper, as specified in Removing Wrapper.
2. Remove the clamps and hoses from the suction and discharge of the pump.
3. Remove the screws securing the pump to the base.
4. Disconnect the wire leads from the pump motor and remove the pump.
5. Remove all fittings from the pump and install them on the new pump.
6. Install the pump and re-connect wire leads and hoses.
7. Install the wrapper.

© 2002-2014, Cornelius Inc.

Publication Number: 91272

FLUID RECOMMENDATION

Cornelius chillers are designed to operate with water to provide maximum performance for temperatures of 40° F (4.4° C) to 100° F (37.8° C).

Distilled Water	Acceptable
De-Ionized Water (1-5 Meg ohms)	Acceptable
De-Ionized Water (5+ Meg ohms)	Acceptable with Stainless Steel & PVC only (No Copper or Brass)
Propylene Glycol (Lab & Industrial Grade)	Acceptable - 30% Glycol/70% Water (For Applications with Temperatures below 40° F)
Lab & Industrial Grade Ethylene Glycol	Acceptable - 30% Glycol/70% Water (For Applications with Temperatures below 40° F)
Mineral/Hydraulic Oils **(Commercial/Automotive Antifreeze)**	NOT Acceptable (Silicate Rust Inhibitors in Automotive/Commercial anti-freeze damages pump seals and housing which lead to failure.)
Acidic/Basic Solutions (Above 8 or below 6 PH)	Not Acceptable
Mineral/Hydraulic Oils (Viscosity > 50 Centistrokes)	Not Acceptable

For questions regarding special or other fluids contact Cornelius at 800-551-4423.

To purchase Lab or Industrial Glycol contact:

Cornelius, 1-800-551-4423 - Part No. 111521000, 5 Gal.

 © 2002-2014, Cornelius Inc.

TROUBLESHOOTING

WARNING:
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work.

Failure to comply could result in serious injury, death or damage to the equipment.

Trouble	Problem Cause	Remedy
Chiller does not operate.	A. No Power to unit.	A. Check main disconnect fuses, wiring and power lead to unit.
	B. Loose or poor wire connection.	B. Check wiring. Correct for loose or poor wire connection.
	C. Inoperable On/Off switch.	C. Replace switch
	D. Overload device open.	D. Allow compressor to cool, the install a new overload device; replace compressor if necessary.
	E. Inoperable relay.	E. Replace relay.
	F. Low input voltage.	F. Supplied voltage must be within 610% of nameplate rating.
No circulation of chilled water.	A. Line to or from chiller is restricted.	A. Inspect lines and remove any obstructions.
	B. Low water level.	B. Ensure that tank is full.
	C. Inoperable pump.	C. Check for obstruction or binding impeller, replace pump and/or motor if necessary.
Inadequate cooling.	A. Condenser is restricted.	A. Clean condenser.
	B. Fan motor not operating freely.	B. Replace fan blade and/or motor, if necessary.
	C. Water not circulating.	C. See "No Circulation of Chilled Water".
	D. Low refrigerant level.	D. Charge system with refrigerant.
	E. Inoperative temperature control.	E. Replace thermostat.

© 2002-2014, Cornelius Inc.

Publication Number: 91272

PARTS LIST

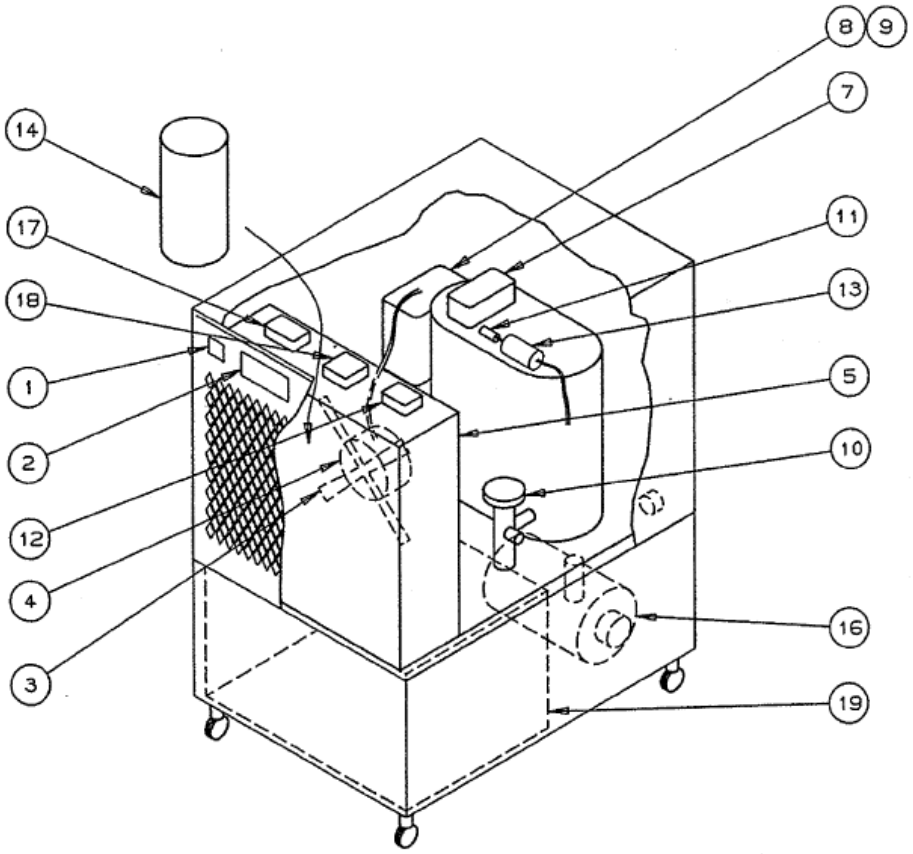

Figure 8. Cabinet Section Exploded View

Table 1. Cabinet Section

Item No.	Part No.	Name
1	31934	Switch, Illuminated (CH550), 115V
	31935	Switch, Illuminated (CH551), 230V
2	32386	Thermostat, Eliwell No. EWPC902
3	620603708	Blade, Fan
4	620603711	Motor, Fan (CH550), 115V
	620603709	Motor, Fan (CH551), 230V
5	*	Condenser
6		Not Used
7	620603701	Compressor, (CH550), 115V
	620603702	Compressor, (CH551), 230V
8	*	Relay

Table 1. Cabinet Section

Item No.	Part No.	Name
9	*	Capacitor
10	61058	TXV
11	60514	Sight Glass
12	60502	Control, Low Pressure
13	638004393	Filter Drier
14	*	Receiver
15		Not Used
16	*	Pump, Circulating
17	32378	Transformer, Thermostat
18	32606	Contactor, Relay 115V
	32607	Contactor, Relay 230V

© 2002-2014, Cornelius Inc.

Publication Number: 91272

 © 2002-2014, Cornelius Inc.

Cornelius Inc.
www.cornelius.com